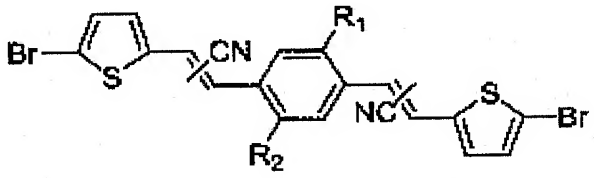
7. The device as defined in claim 6, wherein the device is a multi-layer film structure comprising a semitransparent electrode, a hole transporting layer, the polymer light-emitting layer, an electron transporting layer and a metal electrode successively laminated on a substrate.

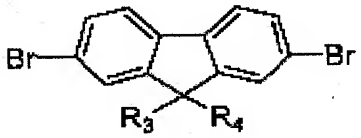
8. The device as defined in claim 6, wherein the polymer light-emitting layer is formed by blending the light-emitting copolymer with an electron or a hole transporting polymer.

9. A method of preparing the light-emitting copolymer of claim 1, comprising the step of copolymerizing a monomer represented by the following formula 2 and another monomer represented by the following formula 3 in the presence of nickel(0) catalyst:

Formula 2



Formula 3



wherein R_1 and R_2 represent silyl groups, alkyl groups or alkoxy groups; and R_3 and R_4 represent alkyl groups.

10. The method as defined in claim 9, wherein R_1, R_2, R_3 and R_4 contain C_1 to C_{22} linear or branched alkyl groups.

ABSTRACT

Disclosed is a light-emitting copolymer having a wavelength range of emitting not only blue light but also red light, as represented by the following formula 1, in which the energy of blue light emission from a fluorene repeating unit on a blue light-emitting fluorene-based main chain is transferred to a red comonomer in the copolymer to emit red light. An electroluminescence device using the light-emitting copolymer is also disclosed.

Formula 1

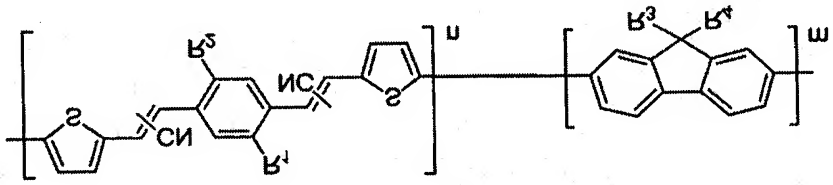


FIG.1

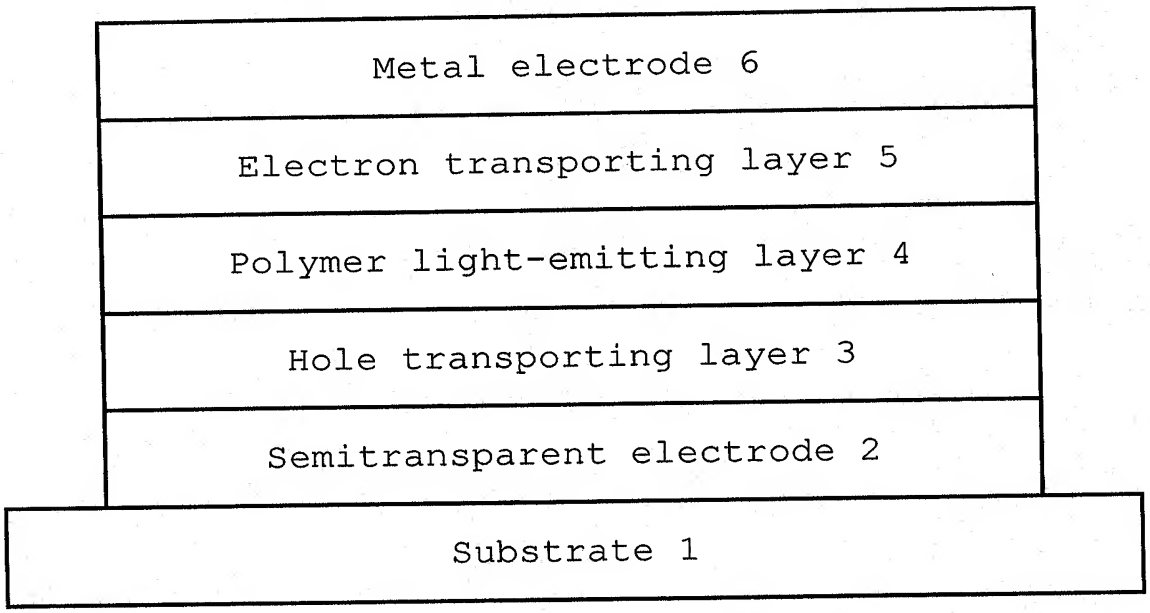

Metal electrode 6
Electron transporting layer 5
Polymer light-emitting layer 4
Hole transporting layer 3
Semitransparent electrode 2
Substrate 1

FIG.2

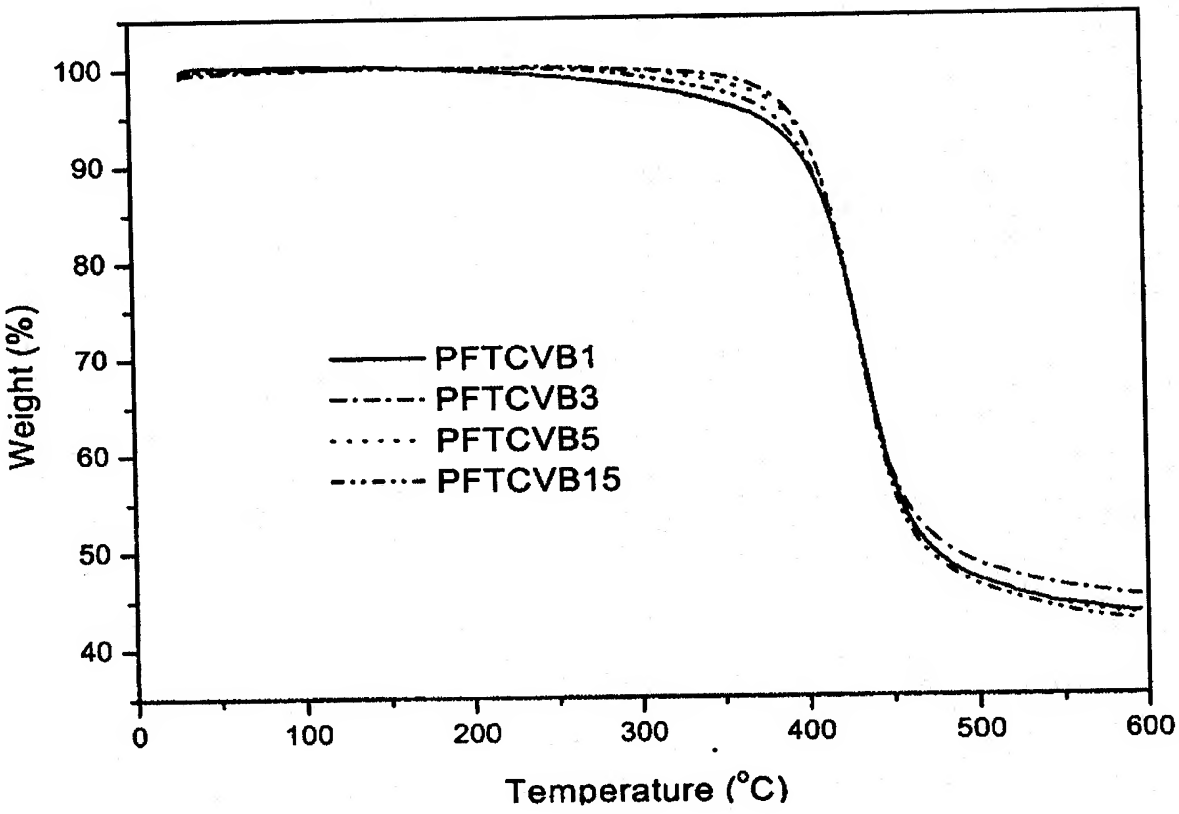

100
90
80
70
60
50
40
Weight (%)
0
100
200
300
400
500
600
Temperature (°C)
PFTCVB1
PFTCVB3
PFTCVB5
PFTCVB15

FIG.3

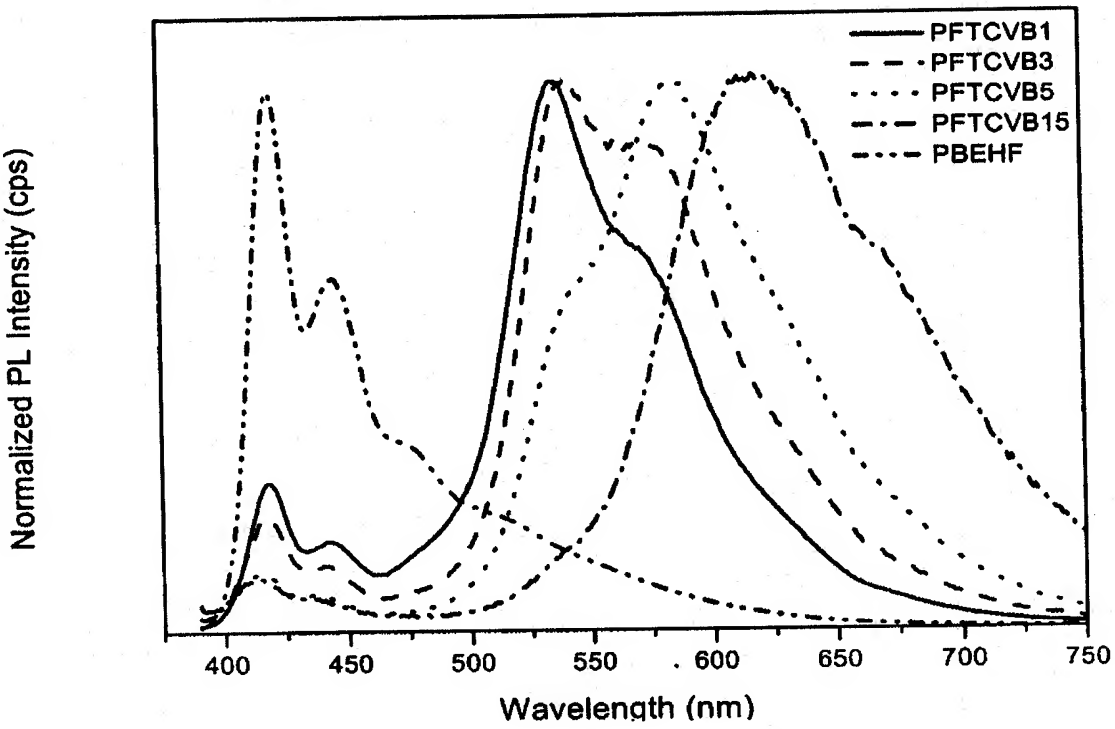

PFTCVB1
PFTCVB3
PFTCVB5
PFTCVB15
PBEHF
Normalized PL Intensity (cps)
400
450
500
550
600
650
700
750
Wavelength (nm)

FIG.4

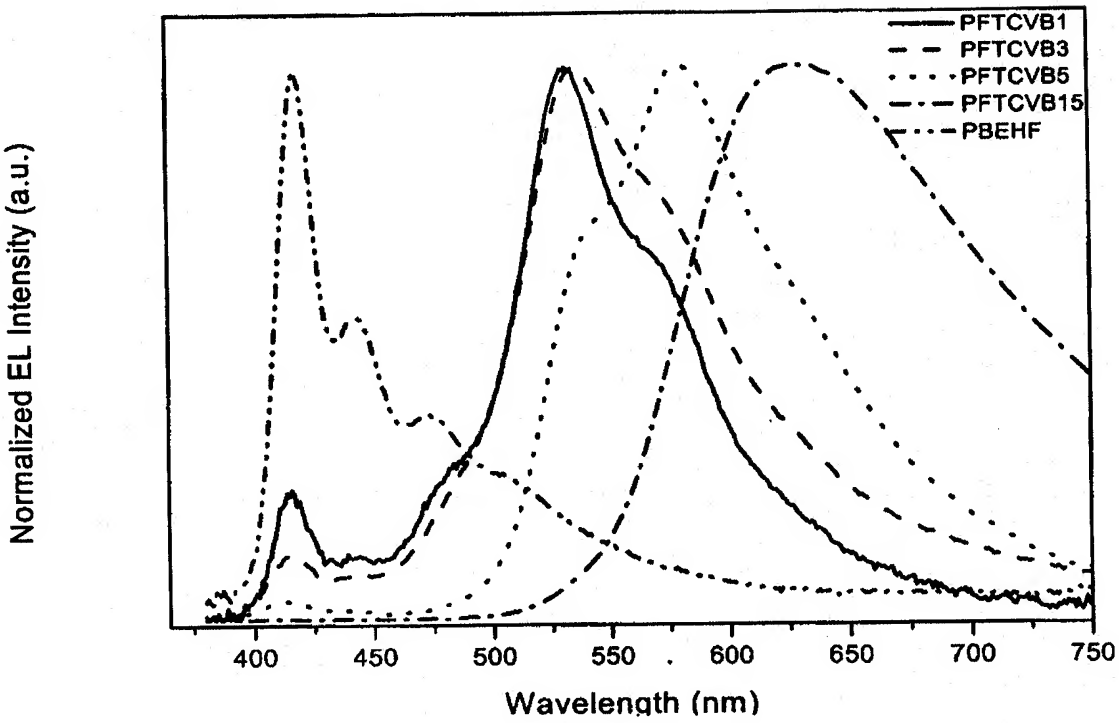

PFTCVB1
PFTCVB3
PFTCVB5
PFTCVB15
PBEHF
Normalized EL Intensity (a.u.)
400
450
500
550
600
650
700
750
Wavelength (nm)

FIG.5

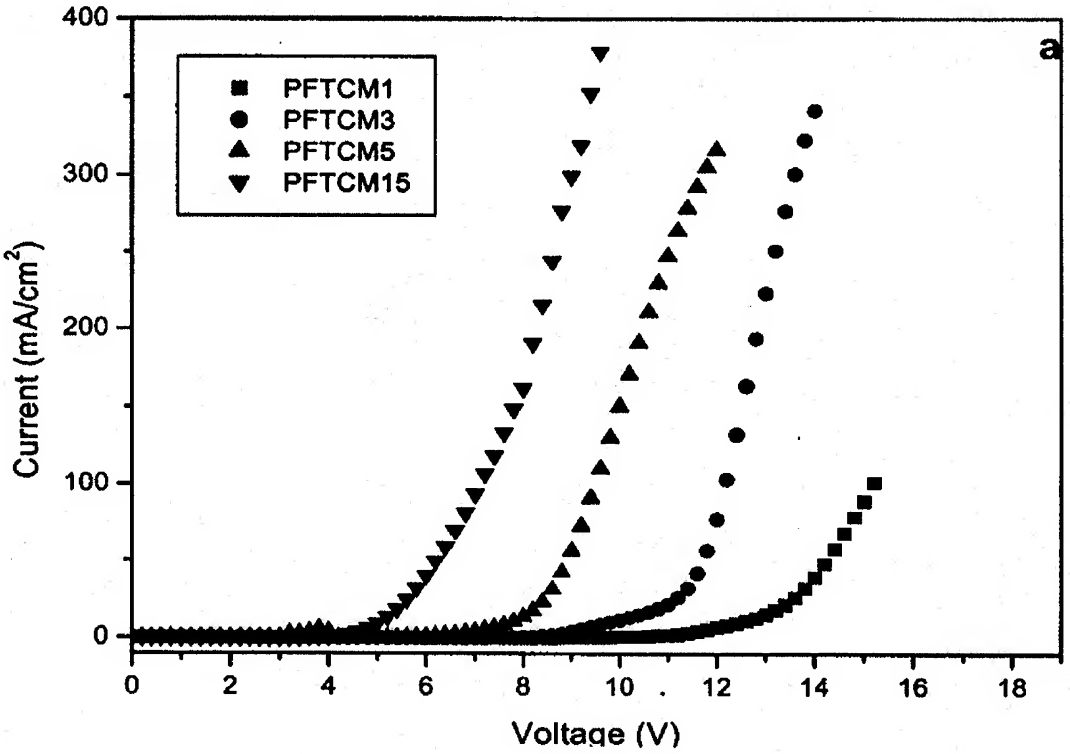
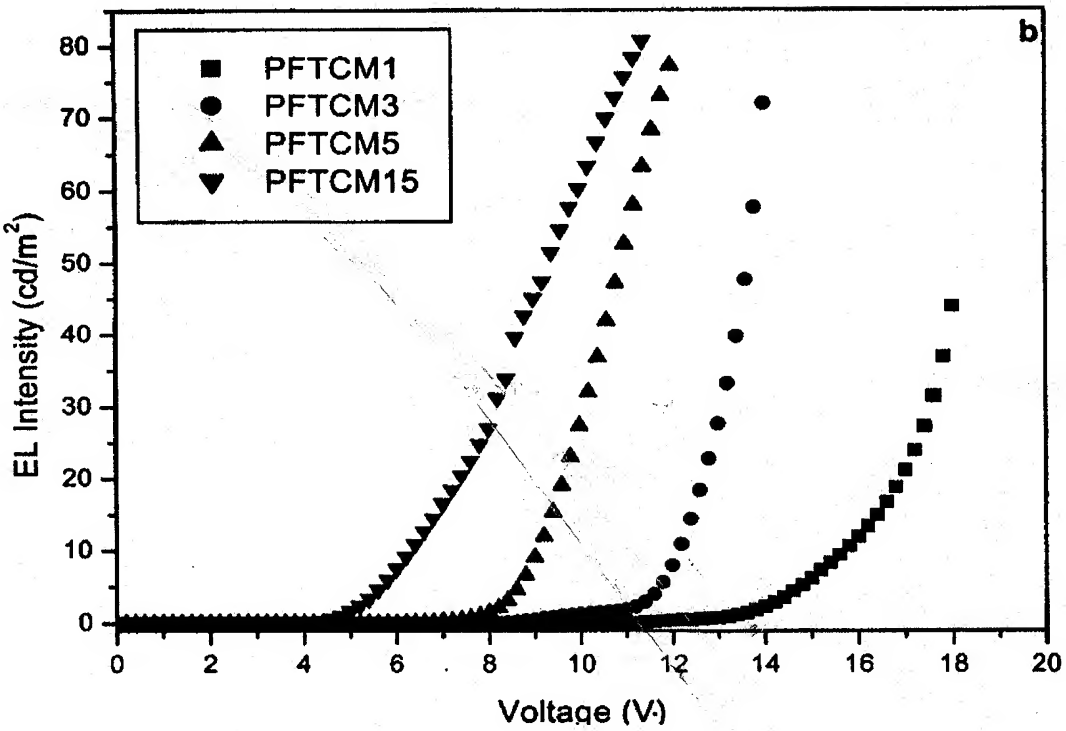

400
300
200
100
0
Current (mA/cm^2)
0
2
4
6
8
10
12
14
16
18
Voltage (V)
PFTCM1
PFTCM3
PFTCM5
PFTCM15
a

FIG.6


b
PFTCM1
PFTCM3
PFTCM5
PFTCM15
EL Intensity (cd/m^2)
Voltage (V)
0
10
20
30
40
50
60
70
80
0
2
4
6
8
10
12
14
16
18
20